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The hitch-hikers guide to the Late Jurassic — Basement structures provide clues to dinosaur migration routes

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Since the first discovery of a megatracksite in the Late Jurassic (Late Kimmeridgian) in the northern Jura mountains (Meyer, 1993), numerous tracksites have come to light. Following the documentation of another large tracksite (Meyer & Lockley, 1996) additional sites have demonstrated that those constitute all together a second megatracksite. Bio- and lithostratigraphic correlations indicate a Mid to Late Kimmeridgian age (Meyer & Thüning, 2003). Today we know of at least five intervals with tracks and bones that span from the Kimmeridgian into the Tithonian. Within these recurrent associations four different morphotypes of dinosaurs are present. Among those are small, medium-sized and large sauropod (wide- and narrow-gauge type) and large and very small theropods (e.g. Marty et al., 2003). The tracklevels occur at the end shallowing-upward cycles and are often found in barren micrites that show fenestrate fabric, birds-eyes and stromatolites deposited in a tidal flat environment.

The recurrent association of sauropod and theropod footprints over a large area is consistent with the Brontopodus Ichnofacies concept of Lockley et al. (1994).

When seen in a larger palinspastic context, all those tracksites occur at conspicuous locations. Contra the idea of megatracksites as large continuous surfaces we can conclusively demonstrate that the occurrence of tracksites is controlled by ancient basement structures. When plotted on the subsurface Permian horst and graben structure it becomes evident that all sites including tracks and skeleton remains lie on horst structures. These shallow water to emergent areas are arranged in ESE–NNW direction and link the northeast corner of the Massif Central with the southwest corner of the London

Brabant massif (Jank et al., 2006). These travel corridors are linked to 3rd order sea-level cycles. Thus we present the “Stargate” hypothesis – “open gate” each million year - that explains recurrent migration routes for “hitch-hiking” dinosaur travelling from Central France to Germany and Great Britain.

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